

Appl. No. : 10/782,727
Filed : February 18, 2004

REMARKS

In response to the Office Action mailed December 9, 2005, Applicant respectfully requests that the above-referenced application be reconsidered in light of the following comments and amendments.

Drawings and Claim rejections under 35 U.S.C. 112

The Examiner has objected to the drawing for not showing the following features recited in the claims: gas outlet, first apertures, first passages, second passages, second apertures, third apertures, first distributor passages, grooves, recess, wafer handler, first and second holes, first flow path, second flow path, first bore, and second bore.

The Examiner has also rejected claims 1-43 under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement apparently for failing to the terms recited above in the specification.

Applicant respectfully submits that Applicant has merely used in the *original claims* words that do not match those used in the specification and disclosure. As set forth below, this is permissible.

The mere fact that a term or phrase used in the claim has no antecedent basis in the specification disclosure does not mean, necessarily, that the term or phrase is indefinite. There is no requirement that the words in the claim must match those used in the specification disclosure. Applicants are given a great deal of latitude in how they choose to define their invention so long as the terms and phrases used define the invention with a reasonable degree of clarity and precision. MPEP 2173.05(e)

For example, support for “gas outlet” can be found in paragraph 0040 which describes “an outlet 184 for expelling compressed gases from the pump” (i.e., a “gas outlet”). *See also* element 184 in FIG. 1. In a similar manner, (i) “first apertures” and “first passages” in fluid communication with a “first reactant source” and (ii) “second apertures” and “second passages” in fluid communication with a “second reactant source” are described in paragraph 037, which describes main passages 148,149 and in-feed apertures 152, 156 for the “A and B” precursors. “Third apertures” that extend “from the first side to the second side of the gas exchange plate” are also described in paragraph 037, which refers to “exhausts apertures 157”. These components are all shown in Figure 1.

With respect to “first distributor passages” reference is made to paragraph 045, which references the “distributor passages 150, 154 branching off of the main passages 148, 149.”

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With reference to “grooves” and “recesses” reference is made to paragraph 039, which references “main passages 148, 149 and distributor passages 150, 154 (which are formed by surface grooves in the illustrated embodiment) are sealed against the gas exhaust plate 118 from the top side of the passages.”

With reference to “wafer handler”, reference is made to paragraph 0036 and reference to the substrate support plate 114, which “can also be a wafer handler configured to move the wafer in and out of the reaction chamber in the direction indicated by the arrow 134.”

With reference to “holes”, reference is made to paragraph 0053, which describes “holes 508, 509 for attaching the gas inlets 158, 159 are drilled into the side of the gas exchange plate 116.”

With reference to “first flow path” and “second flow path”, reference is made to paragraph 0052, which describes “the gas flow paths defined by the passages 148, 149, 150, 154 and the in-feed apertures 152, 156.”

With reference to “first bore” and “second bore” “extending from an edge of the plate”, reference is made to paragraph 0053, which describes “holes 508, 509 for attaching the gas inlets 158, 159 are drilled into the side of the gas exchange plate 116.” Although this paragraph may not provide specific antecedent basis for the terms, Applicant submits that these *original* claim terms are clearly supported by the Specification.

Applicant respectfully submits that there is clear antecedent basis for these original claim terms. Nevertheless, to advance prosecution, Applicant has chose to amend the Specification to provide more explicit antecedent basis for the terms mentioned above. Because these terms were used in the original claims, no new matter has been added.

With respect to Claims 6, 7 and 16 and their rejection under 112, second paragraph, as being indefinite, Applicant respectfully disagrees with these rejections. One of skill in the art would clearly understand the scope of these claims. Nevertheless, to advance prosecution and to place the claims more in-line with conventional practice, Applicant has amended these claims.

Claim Objections

The typographical error in Claim 10 has been corrected.

Double Patenting Rejection

Claims 1-43 stand provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-43 of co-pending Application No.

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10/428,207. Applicant notes that this co-pending application is under appeal. Thus, Applicant respectfully requests that per USPTO procedures this rejection be held in abeyance until one of the two applications issues.

Claim Rejections under 102(b) and 103(a)

Claims 1-9, 11, 13, 16, 18, 20, 21, 30-32, 34-36 and 39-42 stand rejected under 35 U.S.C. 102(b) as anticipated by Heming (USPN 6,025,013). Claims 10, 12, 22-29, 33, 37, 38 and 43 stand rejected under 35 U.S.C. 103(a) as unpatentable over Heming and view of Oda (USPN 5,010,842). For the reasons set forth below, Applicant respectfully traverses the rejection of these claims.

The present application discloses an improved apparatus for depositing a thin film on a substrate. As described in the specification, a gas exchange plate with apertures for the first reactant, the second reactant and the exhaust advantageously provides for the ability to exhaust through the same plane of the showerhead as the injection points of the reactants. This leads to more uniform application of gasses and is less subject to non-uniformities caused by downstream effects from reaction by-products. In addition, the present application discloses a novel gas exchange plate 116 with passages and apertures for the first and second reactant and exhaust apertures that extend through the exchange plate. This elegant design allows for this gas flow pattern to be simply and cheaply manufactured. In addition, the gas exchange plate can be a replaceable part that does not require disassembly of the entire chamber.

With reference to the primary reference Hemming, this patent discloses a schematic illustration (Figure 1) of a plasma CVD device. The device includes a gas section nozzle 10 with four presumably concentric sections 13, 14, 15, 16. See e.g., FIGS. 7a and 7b and the deformable cylinder 54. The outer exhaust section 16 is positioned on the outside of the sections 13, 14, 15 for the feed gases. Thus, the structure disclosed by Hemming is entirely different than the structure disclosed in the present application. Specifically, instead of a exchange plate with passages formed therein, Hemming merely discloses a plurality of concentric cylinders which are capped by a plate 12 with holes.

Oda merely discloses a combination of pipes 20a. As with Hemming, Oda does not disclose, teach or suggest a gas exchange plate with passages and apertures for the first and second reactant and exhaust apertures that extend through the exchange plate. Accordingly, the gas distribution structure disclosed by Oda is noticeably more complicated than the structure

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disclosed in the present application. Moreover, the exhaust path in Oda is located below the pipes 20a.

Accordingly, neither Hemming nor Oda, either alone or in combination, disclose or suggest plate with passages and apertures formed therein for the first and second reactant and separate exhaust apertures that extend through the exchange plate. For at least this reason, Applicant submits that the rejection of the pending claims is in error.

With respect to the independent claims, Claim 1 recites, in part, a gas exchange plate which includes "a plurality of first passages machined therein being in fluid communication with a first reactant gas source and a purge gas source, the first passages communicating with a plurality of first apertures spaced along the first passages, the first apertures opening to the reaction space; a plurality of second passages machined therein being in fluid communication with a second reactant gas source and a purge gas source, the second passages communicating with a plurality of second apertures spaced along the second passages, the second apertures opening to the reaction space; and a plurality of third apertures extending from the first side to the second side of the gas exchange plate, allowing gas to pass therethrough."

As noted above, the cited references do not disclose either alone or in combination an exchange plate with the above-noted limitations. Instead, Hemming discloses a top plate with merely a plurality openings and Oda discloses a plurality of pipes.

Claim 26 recites, in part, "a first plate a first plate positioned above the substrate support, the first plate having: a first gas inlet fluidly connected to a first plurality of apertures via a first gas pathway; a second gas inlet fluidly connected to a second plurality of apertures via a second gas pathway, wherein the first and second pathways are machined into the first plate; a third plurality of apertures allowing gas to pass through the first plate."

The cited references do not disclose either alone or in combination an plate with the above-noted limitations.

Claim 27 recites, in part, "a gas exchange plate having a thickness between a first side and a second side, the gas exchange plate defining a first network of passages in fluid communication with a first gas inlet and a second network of passages in fluid communication with a second gas inlet, the first and second network of passages including a plurality of first and second apertures opening from the first and second network of passages, respectively, to the second side of the gas exchange plate, the first and second apertures being interspersed and

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spaced across the second side of the gas exchange plate, the gas exchange plate further including a plurality of third apertures extending from the first side to the second side through the thickness of the gas exchange plate and being isolated from the first and second network of passages.”

The cited references do not disclose either alone or in combination an exchange plate with the above-noted limitations.

Claim 34 recites in part a showerhead plate “having a first flow path through the showerhead plate, the first flow path including a plurality of first apertures opening to the second side of the showerhead plate; a second flow path through the showerhead plate, the second flow path isolated from the first flow path within the plate, the second flow path including a plurality of second apertures opening to the second side of the showerhead plate; and a plurality of third apertures extending through the showerhead plate, the third apertures isolated from the first and second flow paths within the showerhead plate.”

The cited references do not disclose either alone or in combination an showerhead plate with the above-noted limitations.

The remaining claims depend either directly or indirectly on one of the independent claims discussed above. For at least this reason, these claims are also in condition for allowance.

CONCLUSION

For the foregoing reasons, it is respectfully submitted that the rejections set forth in the outstanding Office Action are inapplicable to the present claims. Accordingly, early issuance of a Notice of Allowance is most earnestly solicited.

The undersigned has made a good faith effort to respond to all of the rejections in the case and to place the claims in condition for immediate allowance. Nevertheless, if any undeveloped issues remain or if any issues require clarification, the Examiner is respectfully requested to call Applicant's attorney in order to resolve such issue promptly.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

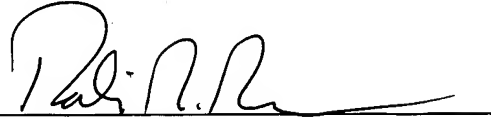
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Respectfully submitted,

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